National Institute of Environmental Health Sciences

El Niño Southern Oscillation (ENSO) and annual malaria incidence in Southern Africa

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Abstract:

We evaluated the association between annual malaria incidence and El Niño Southern Oscillation (ENSO) as measured by the Southern Oscillation Index (SOI) in five countries in Southern Africa from 1988 to 1999. Below normal incidence of malaria synchronised with a negative SOI (El Niño) and above normal incidence with a positive SOI (La Niña), which lead to dry and wet weather conditions, respectively. In most countries there was a positive relationship between SOI and annual malaria incidence, especially where Anopheles arabiensis is a major vector. This mosquito breeds in temporary rain pools and is highly sensitive to fluctuations in weather conditions. South Africa and Swaziland have the most reliable data and showed the strongest associations, but the picture there may also be compounded by the moderating effect of other oscillatory systems in the Indian Ocean. The impact of ENSO also varies over time within countries, depending on existing malaria control efforts and response capacity. There remains a need for quantitative studies that at the same time consider both ENSO-driven climate anomalies and non-ENSO factors influencing epidemic risk potential to assess their relative importance in order to provide an empirical basis for malaria epidemic forecasting models. © 2006.

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Resource Description

Early Warning System: ☑

resource focus on systems used to warn populations of high temperatures, extreme weather, or other elements of climate change to prevent harm to health

A focus of content

Exposure : ☑

weather or climate related pathway by which climate change affects health

Ecosystem Changes, El Nino Southern Oscillation, Temperature

Temperature: Fluctuations

Geographic Feature: ☑

resource focuses on specific type of geography

None or Unspecified

Geographic Location: ☑

resource focuses on specific location

Non-United States

Non-United States: Africa

African Region/Country: African Country

Other African Country: Botswana; South Africa; Swaziland; Zambia; Zimbabwe

Health Impact: ☑

specification of health effect or disease related to climate change exposure

Infectious Disease

Infectious Disease: Vectorborne Disease

Vectorborne Disease: Mosquito-borne Disease

Mosquito-borne Disease: Malaria

Mitigation/Adaptation: ☑

mitigation or adaptation strategy is a focus of resource

Adaptation

Model/Methodology: ☑

type of model used or methodology development is a focus of resource

Outcome Change Prediction

Resource Type: ☑

format or standard characteristic of resource

Research Article

Timescale: ☑

time period studied

Short-Term (

Vulnerability/Impact Assessment: ☑

resource focus on process of identifying, quantifying, and prioritizing vulnerabilities in a system

A focus of content